CHAPTER 3: EXISTING CONDITIONS IN THE WATERSHEDS

Miramar Watershed

Water Sources -

Miramar Reservoir is important to the region for its supply from the SDCWA Aqueduct System carrying Colorado River and State Project water to the San Diego area. The primary function of the reservoir is to store imported water and provide short-term emergency supply to the Miramar Water Treatment Plant (Figure 4-3.1). The reservoir and associated facilities are owned and operated by the City of San Diego.

Raw Water Reservoirs -

Miramar Reservoir lacks back-up storage and has the second smallest capacity of all the reservoirs in the City system. Miramar Dam is a zoned earth embankment situated on a canyon incised in volcanic rock. A forty foot-high saddle dike also exists within the reservoir. The spillway is an un-gated open channel with a 10-foot-wide concrete control section and is located between the main dam and the dike. The spillway capacity is 432 cubic feet per second (cfs). The dam crest has a length of 1,189 feet and stands roughly 150 feet above the streambed. The reservoir has a storage capacity of 7,184 acre-feet and a surface area of 162 acres at spillway crest at 714 feet MSL.

Raw Water Intake and Conveyance Facilities -

The reservoir outlet consists of an independent wet tower upstream of the dam with seven 36-inch saucer inlet valves for selective level draft control. Water is released from the tower through a 48-inch reinforced concrete conduit located at the base of the dam. The 48-inch pipeline discharges

through a 24-inch blow off pipeline. The 48-inch pipeline has a maximum draft rate of 109 cfs (70 mgd) to the treatment plant and 141 cfs (91 mgd) to the treatment plant and 24-inch blow off.

Treated Water Facilities -

All treatment facilities and treated water facilities for Miramar Reservoir occur at and beyond the Miramar Water Treatment Plant. The plant is located at Miramar Reservoir and serves the northern section of the City. The plant treats imported water stored in Miramar Reservoir. The Miramar Water Treatment plant is of conventional design with flocculation, filtration, disinfection (chloramines) and has 140 mgd capacity. The plant is operated in compliance with California's Chapter 17: Surface Water Filtration and Disinfection Treatment Regulations.

Miramar Water Treatment Plant is currently undergoing the Contract A expansion project scheduled for completion in 2007. This project will increase the capacity of the plant to 215 mgd.

Emergency Plans -

There are no written emergency plans addressing accidental or intentional disposal of contaminants to the raw water supply system for the City. However, the City does have the following two procedures which are understood policies, should an emergency occur relating to water quality:

- If a treatment plant cannot treat the water to an approved health standard level, due to upstream contaminants or treatment plant failures, the treatment plant shall be shut down. Treated water shall then be re-directed to the downed service area through the distribution system from other treatment plants.

- If any emergency exists, the City has a chain of communication procedure for notification of City staff.

NATURAL SETTINGS

Slope

Slope is recognized as a critical factor in generating soil slips/landslides. In Southern California a direct relationship exists between frequency of soil slips and slope. USGS estimates that 70% of soil slips originate in slopes between 20° and 36°.These soil slips have the potential to increase sedimentation in streams and reservoirs.

Water falling on steeply-sloped land runs off with greater velocity and infiltrates less than water falling on flat land. This response leads to increased erosion and limits the soils natural ability to absorb contaminants. Information on slope was derived from a digital elevation model provided by San Diego Data Processing Corporation and United States Geological Survey (USGS).

Miramar Watershed -

No changes in slope have occurred since 2000 (Figure 4-3.2, Table 4-3.1).

Table 4-3.1
Miramar Watershed Slope

Slope	Acres	Percent
0 - 15°	385.51	59.78
16 - 25°	162.20	25.15
26 - 50°	95.86	14.87
> 50°	1.30	0.20
Total	644.87	100.00

Soils

Most of the soils within the watershed are susceptible to erosion. The erosion of these soils is mitigated through the anchoring affect of natural vegetation (see vegetation section). Impacts to the vegetation through fire, development or other means could cause increased erosion and impact surface water quality (see Fires, Land Use, Rainfall and Runoff).

Miramar Watershed -

The Miramar Watershed is comprised of the Redding-Olivenhain Association (Figure 4-3.3). This soil is predominantly well drained, cobble and gravelly loams over hardpan.

Vegetation

Vegetation cover provides several ecological services pertinent to water quality. The root systems of plants anchor soil that could otherwise erode into streams and reservoirs (see Soils). Wetlands and other riparian plant communities act as natural filters, removing suspended sediments and contaminants. Sediments are trapped by densely growing wetland plants, and many contaminants are absorbed or chemically altered by the vegetation.

The description of the different plant communities found in the watershed (Sawer and Keeler-Wolf classification, 1995) and their respective response to fire is from the 2003 Southern California Fires Burned Area Emergency Stabilization and Rehabilitation Plan prepared by: Interagency Burned Area Emergency Response Team November, 2003. The maps of vegetation communities (Figure 4-3.4, Table 4-3.2) have been updated using current SANDAG GIS data.

Eucalyptus Woodland

Vegetation Types:

Eucalyptus Woodland is a non-native closed canopy community. This community is typically a monotypic stand of Eucalyptus trees with a thick mulch of Eucalyptus tree leaves.

Response to Fire:

Eucalyptus stands can be fire retardant to low intensity fires. Low intensity fires will consume the leaf litter and can be carried into the canopy where leaves are singed or tops are burned. High intensity fires are typically stand destroying.

Chaparral

Vegetation Types:

Chaparral occurs throughout the coastal lowlands, foothills, and montane region. This community typically forms a dense, almost impenetrable shrub community with no herbaceous layer. Chaparral is a highly variable plant community that includes; Chamise Chaparral, Coastal Sage-Chaparral Scrub, Mixed Chaparral, Montane Chaparral, Semi-desert Chaparral, and Scrub Oak Chaparral.

Response to Fire:

Chaparral is a fire adapted community that stump sprouts or germinates from seed after a low-to–moderate intensity burn. Large fires often result in homogenous stands of chaparral. Frequent fires and hot fires can burn the root system and surface seed bank, resulting in a loss of diversity and low-density vegetative communities. For a few years after a fire, annual forbes germinate and establish on site, until the woody shrubs mature.

Coastal Sage Scrub

Vegetation Types:

Locally, Coastal Sage Scrub consists of low, woody soft-shrubs and is classified as Diegan Coastal Sage Scrub (DCSS). DCSS is dominated by California sagebrush and/or flat-topped buckwheat and often intergrades with Chaparral communities.

Response to Fire:

DCSS species are fire adapted and quickly regenerate from seed after a fire. However, frequent fires in an area can reduce the seed bank for native shrub species and increase the presence of non-native grasses and forbs resulting in degraded habitat. Once this habitat conversion occurs, DCSS species typically do not re-colonize the area due to competition from dense populations of invasive grasses that increase the fire frequency. Areas with moderate to highly degraded DCSS may convert to non-native grasslands due to the 2003 fires.

Big Sagebrush Scrub

Vegetation Types:

Locally, big sagebrush is dominated by; flat-topped buckwheat, broom snakeweed, deerweed, sawtoothed goldenbrush, and includes a variety of DCSS species.

Response to Fire:

The fire ecology of Big Sagebrush Scrub in eastern San Diego County is not well documented. Many of the associates in this community occur in DCSS and are fire adapted. Frequent fire in the vegetative community will result in habitat conversion to non-native grasslands.

Grasslands

Vegetation Types:

Perennial Grasslands vary among Valley Needlegrass and Valley Sacaton

grasslands. Valley Needle Grassland is dominated by the tussock forming purple needlegrass, with a variety of native forbs including colar lupin, rancher's fireweed, and adobe popcorn-flower; and the native bunchgrasses, foothill needle grass, and coast range melic. The species composition can vary as it transitions into the foothills and montane zone. Valley Sacaton Grassland is dominated by sacton or salt grass. This community typically occurs in the areas with a high seasonal water table and is often associated with Alkali Seeps and Alkali Meadows. Non-native grasslands are dominated by Red brome, Ripgut brome, and Softchess brome. Non native grasslands often intergrade with open oak woodlands and disturbed DCSS communities.

Response to fire:

Grassland communities in San Diego County have evolved with, and are typically maintained by fire. Fire in non-native grasslands maintains dominance by invasive grasses and prevents establishment by native shrub species.

Miramar Watershed:

Native vegetation identified within the Miramar Watershed includes scrub and chaparral, and grasslands (Figure 4-3.4, Table 4-3.2). The remainder of the watershed is developed for urban uses, which could negatively impact water quality (see Land Use).

Table 4-3.2 Vegetation in the Miramar Watershed

Vegetation Type	Acres	% of Watershed
Wetlands	0	0
Forest	0	0
Grasslands, Vernal Pools, Meadows, other Herb Communities	10	2
Non-Native Vegetation, Developed or Un-vegetated Habitat	405	63
Riparian	0	0
Scrub and Chaparral	230	36
Woodland	0	0
Total	645	100.0

Rainfall and Runoff

The climate of San Diego County is classified as a Mediterranean dry summer type where 90% of the annual rainfall occurs between the months of November and April. Annual precipitation varies from 9 inches at the coast to 25 inches near the mountains.

Storm water runoff occurs when water from rain or snowmelt flows over the ground. Impervious surfaces like driveways, sidewalks, streets and parking lots prevent the runoff from naturally soaking into the ground. Storm water runoff can collect debris, sediment, nutrients, bacteria, pathogens, chemicals and deposit them directly into a lake, stream, river, wetland, or coastal water.

Rainfall and Runoff information in this section was supplied by the City of San Diego Water Department, Hydrography Section. Rainfall data is collected at each reservoir by a weather station. Runoff data is estimated monthly by measuring the following: amount of rainfall, rain amount on surface of lake, other inputs, evaporation, draft, leaks, and change in lake level.

Miramar Watershed:

Table 4-3.4 shows annual rainfall and runoff at Miramar Reservoir. Rainfall totals for years 2001-2003 were average or below average. The winter of 2004-2005 was the third wettest on record.

Table 4-3.4 Rainfall and Estimated Runoff for Miramar Reservoir

Reservoir	Year	Rainfall (in.)	Runoff Entering Reservoirs (M.G.)
Miramar	2001	14.44	0
	2002	6.94	0
	2003	12.18	19.77
	2004	15.12	0
	2005	18.9	0

Fires

The California Department of Forestry (CDF) addresses all large brush fires within the watershed. The local fire districts handle structural fires only. CDF has an extensive fire prevention plan which includes three fire safe guidelines: residential, railway, and electrical power lines. CDF also provides an evaluation of burned sites and a re-growth plan to prevent erosion immediately following a fire.

Fire can indiscriminately devastate certain vegetation and wildlife communities, but is very important to the sage scrub and chaparral communities. Many taxa of coastal sage scrub plants are adapted to fire by stump sprouting or high seed production (Skinner et al., 1994). Similarly, many chaparral plants are adapted to frequent fires either through resprouting or seed carry-over (see Vegetation). While these communities are adapted to fire and usually recover in three to five years following such an event, the soils are subject to increased erosion immediately following a burn (see Fires, Soils).

Sediment from the burned areas can impact streams and the aquatic organisms within those streams, ultimately feeding into reservoirs where sediment loads may affect treatment procedures. Control of large fires is important from both a preservation perspective as well as a watershed management perspective.

The fire and water districts in the watershed do not measure the water quality impacts of the runoff from burned areas (Calhoun, Justice, Bratton, 1995). In most cases the County Office of Emergency Response or the local Fire Department contacts the RWQCB to visit the site after the fire is contained. The RWQCB participates in assessing the impact of the fire on the surface water quality, and will determine if monitoring is necessary.

Fire information in this report is supplied by the California Department of Forestry. The current data available from CDF is through December 31, 2004.

Miramar Watershed:

There were no fires in this watershed that affected water quality or the ability of Miramar Treatment Plant to meet the Enhanced Surface Water Treatment Rule.

SUMMARY OF POTENTIAL CONTAMINANT SOURCES

Land Use -

The section on land use includes; land ownership, category of land use, and population density.

Land Ownership

The land ownership information discussed in this section is primarily derived from SanGIS data. SanGIS maintains a database of land ownership information, by parcel, for San Diego County.

Miramar Watershed:

Approximately 76% of Miramar Watershed is in public ownership (Figure 4-3.5, Table 4-3.5).

Table 4-3.5 Land Ownership in Miramar Watershed

Ownership Category	Area (acres)	% of Watershed
Indian Reservation	0	0.0
Publicly Owned		
Local	492	76.3
State	0	0.0
Federal	0	0.0
Subtotal Publicly owned	492	76.3
Private	153	23.7
Total	645	100

Existing Land Use

The information discussed in this section is based on SanGIS data. It is important to note that some areas reported in the 2001 Watershed Sanitary

Survey (WSS) as vacant and undeveloped land use have been updated by SanGIS to reflect its correct land use type, parks and open space preserves.

Miramar Watershed:

Since 2000, land use in the Miramar Watershed has experienced little change (Figure 4-3.6, Table 4-3.6). Currently, parks account for almost 55% of the watershed area, while 24% of the land is used for urban and residential purposes, which is a 3% increase since 2000 (see Rainfall and Runoff). The reservoir occupies the remaining 21% of the watershed. No commercial agriculture occurs in the Murray Watershed.

Table 4-3.6 Existing Land Use in the Miramar Watershed

Land Use Category	Area (acres)	% of Watershed
Parks	353.01	54.74
Single Family Residential	108.65	16.85
Multi Family Residential	7.90	1.23
Transportation, Communications and Utilities	39.93	6.19
Water	135.38	20.99
Total	644.87	100.00

Agriculture

Miramar Watershed:

Agricultural practices in the Miramar Watershed consist only of home gardens and hobby farms which are not included in this report. No poultry ranches or dairy farms are permitted with the San Diego County Department of Environmental Health or the Regional water Quality Control Board in the Miramar Watershed.

Grazing

Miramar Watershed:

No land is permitted for grazing in Miramar Watershed.

Population Density

Population density is a good indicator of the level of urbanization within an area. Land areas with small population densities are usually rural area with natural landscapes that trap rainwater and allow it to filter slowly into the ground (see Rainfall and Runoff). In contrast, large population densities are associated with urbanized areas. These areas contain impervious surfaces that prevent rain from infiltrating into the ground which increases the amount and velocity of runoff. Urbanization increases the variety and amount of pollutants carried into streams, rivers, and lakes. These pollutants can harm fish and wildlife populations, kill native vegetation, foul drinking water supplies, and make recreational area unsafe and unpleasant. The population data presented was derived form SANDAG's 2000 Census.

Miramar Watershed:

The estimated 2005 population of Miramar Watershed is 6,538 people. The average population density throughout the watershed is approximately 10.1 persons per acre. Within the past 5 years, homes were built along the northern boundary which increased the Miramar watershed population 38% (Figure 4-3.7).

Mines

Miramar Watershed:

There are no mines listed with the State Water Resources Control Board (SWRCB) in the Miramar Watershed.

Hazardous Material / Waste

The data presented in this section was obtained from the San Diego County Health Department, RWQCB, and the Solid Waste Assessment Test Program.

Miramar Watershed:

There are no permitted hazardous material / waste storage sites in Miramar Watershed.

Recreation

Miramar Reservoir:

The primary purpose of Miramar Reservoir is for domestic water supply, while recreation is a secondary use of the reservoir. The reservoir is open to the public for boating and fishing four days a week November through September, and to all other recreational activities seven days a week year around. Recreational activities include; boating, fishing, jogging, biking, and picnicking. Water contact activities are not permitted at the reservoir (Table 4-3.7).

Table 4-3.7 Miramar Reservoir Number of Permits Sold

Year	Fishing	Launch	Rentals	
			Motor	Row
2001	13133	1199	NA	1839
2002	9619	658	NA	1467
2003	Closed due to low lake level			
2004*	4133	450	290	325
2005	Figures not reconciled			

* Closed part of the year due to low lake level

The facilities consist of concession, launch, rental boats, trash receptacles, portable toilets and a comfort station. These facilities are owned and operated by the City of San Diego. There are no boat-holding tank pump-out stations, marinas, or berths available at the reservoirs. Trash cans and portable toilets are placed above current water levels.

Miramar Reservoir has a restricted access area encompassing the outlet tower. This area is demarcated by a floating barrier to prevent direct recreational contact to the water immediately available to the Miramar Water Treatment Plant.

The potential sources of contamination associated with the recreational activities include; erosion, trash, microorganisms associated with humans and animals, spillage of petroleum products, and production of combustion byproducts.

Title 22 contaminants are monitored quarterly and nutrients monthly (Figure 4-3.1). Microorganisms including Total Coliforms, E. coli, and Enterococcus are monitored weekly.

Wastewater / Reclaimed Water

Miramar Watershed:
There are no Wastewater treatment facilities permitted by the RWQCB or Reclaimed water distribution in the Miramar Watershed.

Septic systems

Miramar Watershed:

No septic systems are in this watershed, a fully developed sewer system serves this area.

Sanitary Sewer Overflows

Miramar Watershed:

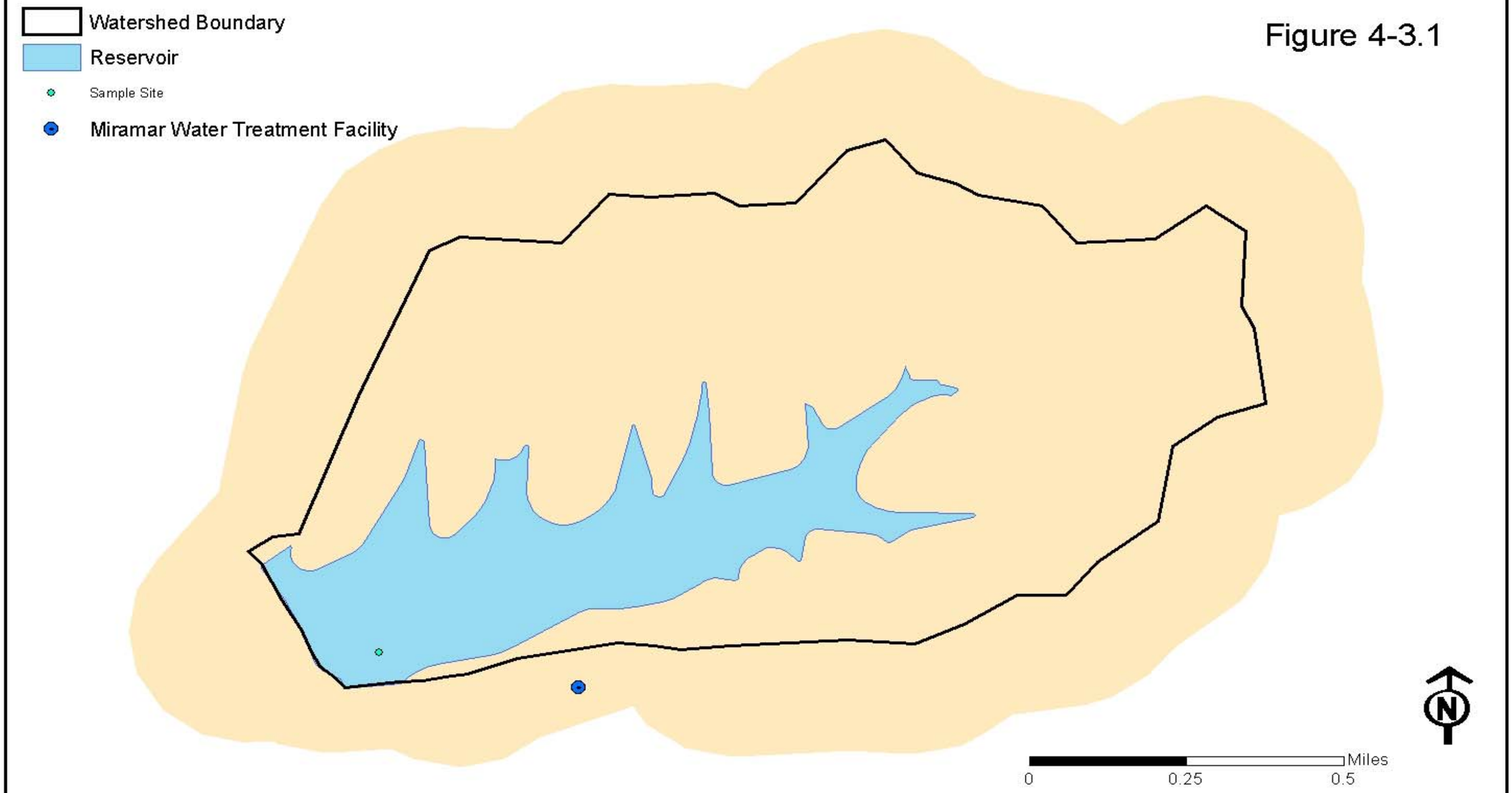
There was one sanitary sewer overflow in the Miramar Watershed reported to the Regional Water Quality Control Board (RWQCB) from 2001 through 2004 (Table 4-3.8). The current data available from the RWQCB is through June 30, 2004. Detailed information regarding sanitary sewer overflows is available at the Regional Water Quality Control Board website (www.swrcb.ca.gov/rwqcb9).

Table 4-3.8 Miramar Watershed Sanitary Sewer Overflows 2001 - 2004

Year	RWCQB Tracking No.	Total Overflow Volume (Gallons)	Overflow Volume Released to Environment (Gallons)	Reach Surface Waters other than Storm Drain?	Receiving Waters
2003	349439	2400	0	N	

Miramar Watershed GENERAL SETTING

Figure 4-3.1



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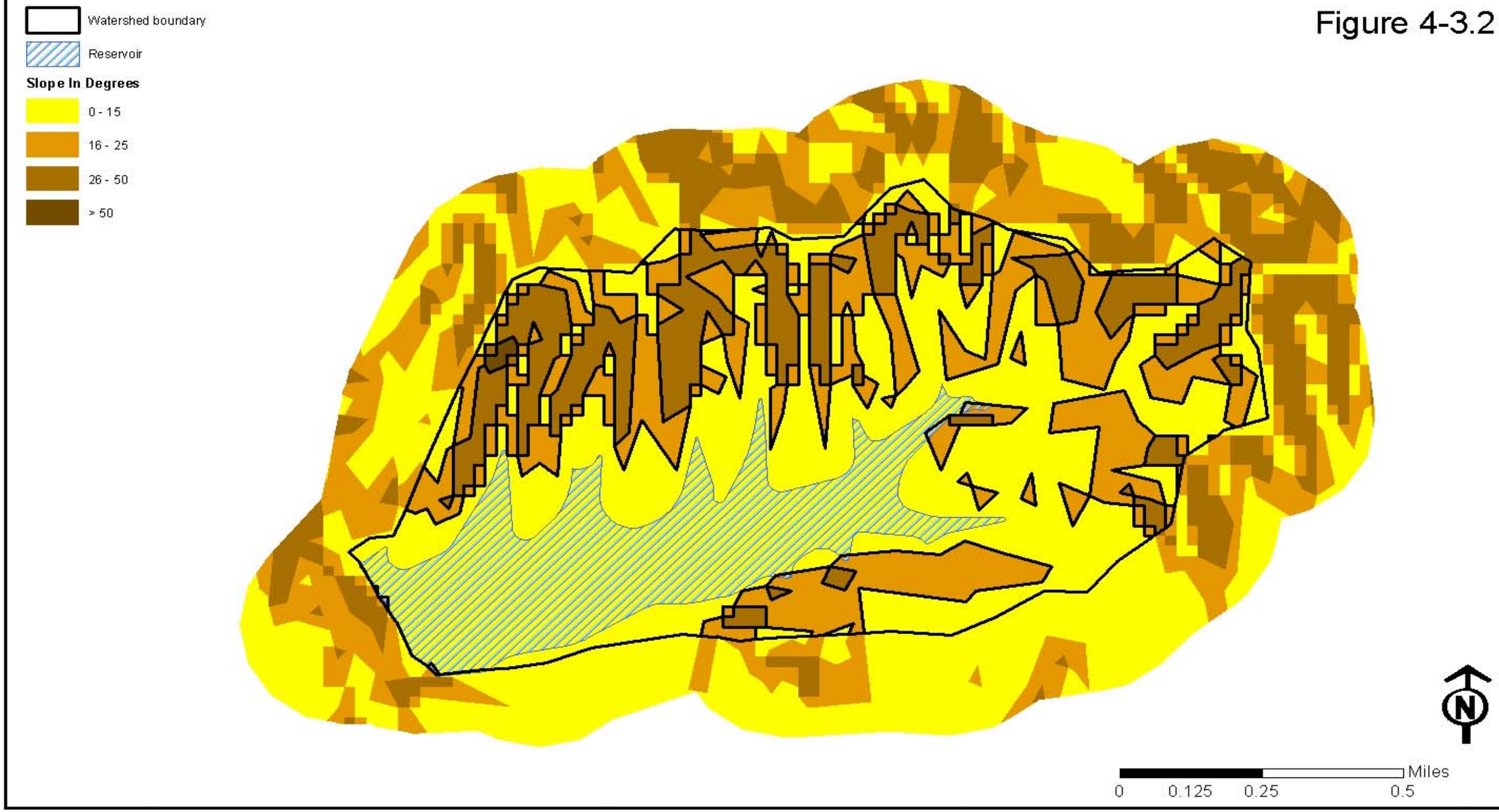
Created By: Dennis Brown

Date: 5 December 2005

Miramar Watershed SLOPE

Figure 4-3.2



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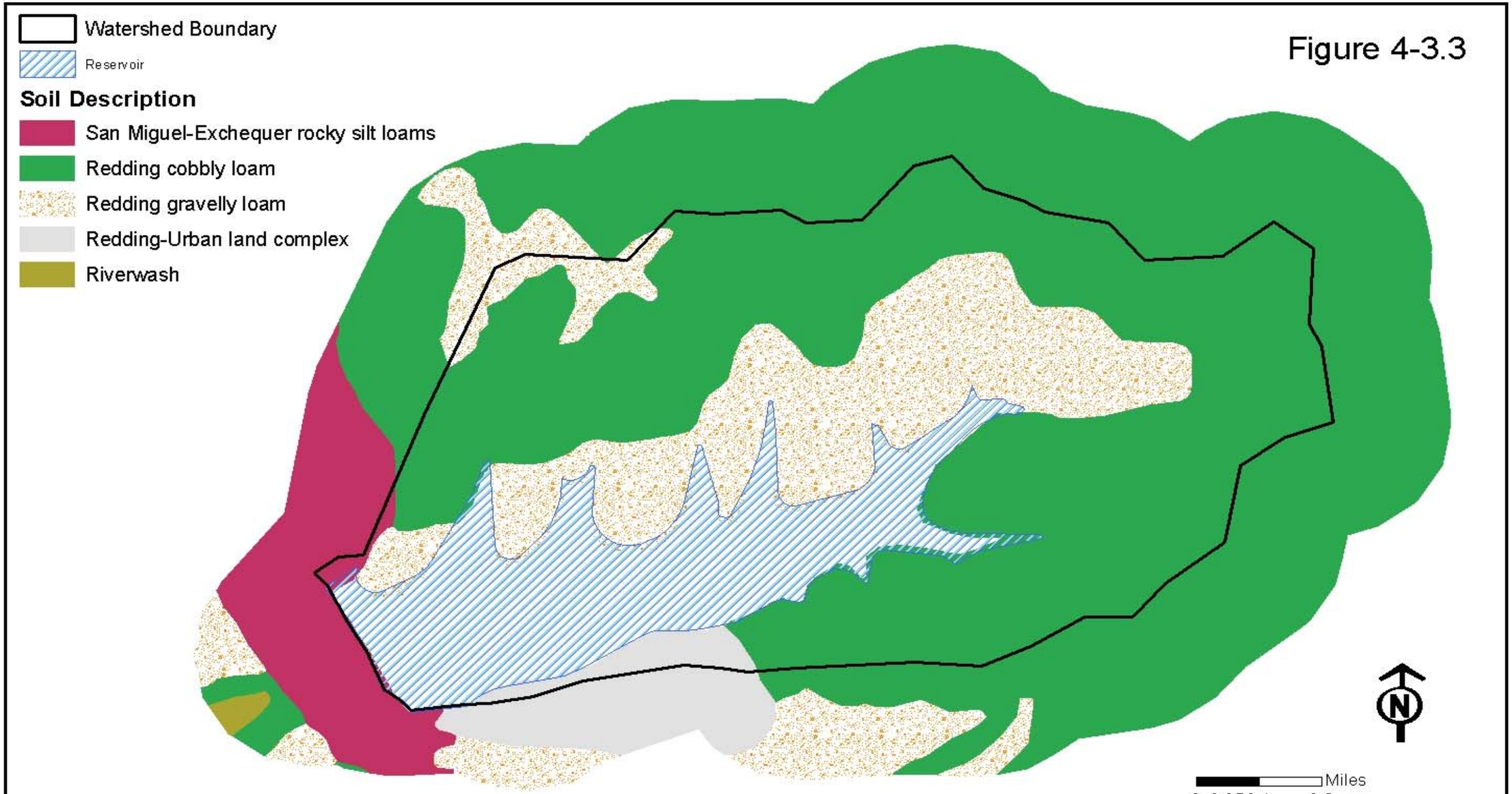
Created By: Dan Daft
Date: 08/02/05

SanGIS

Miramar Watershed SOILS

Figure 4-3.3



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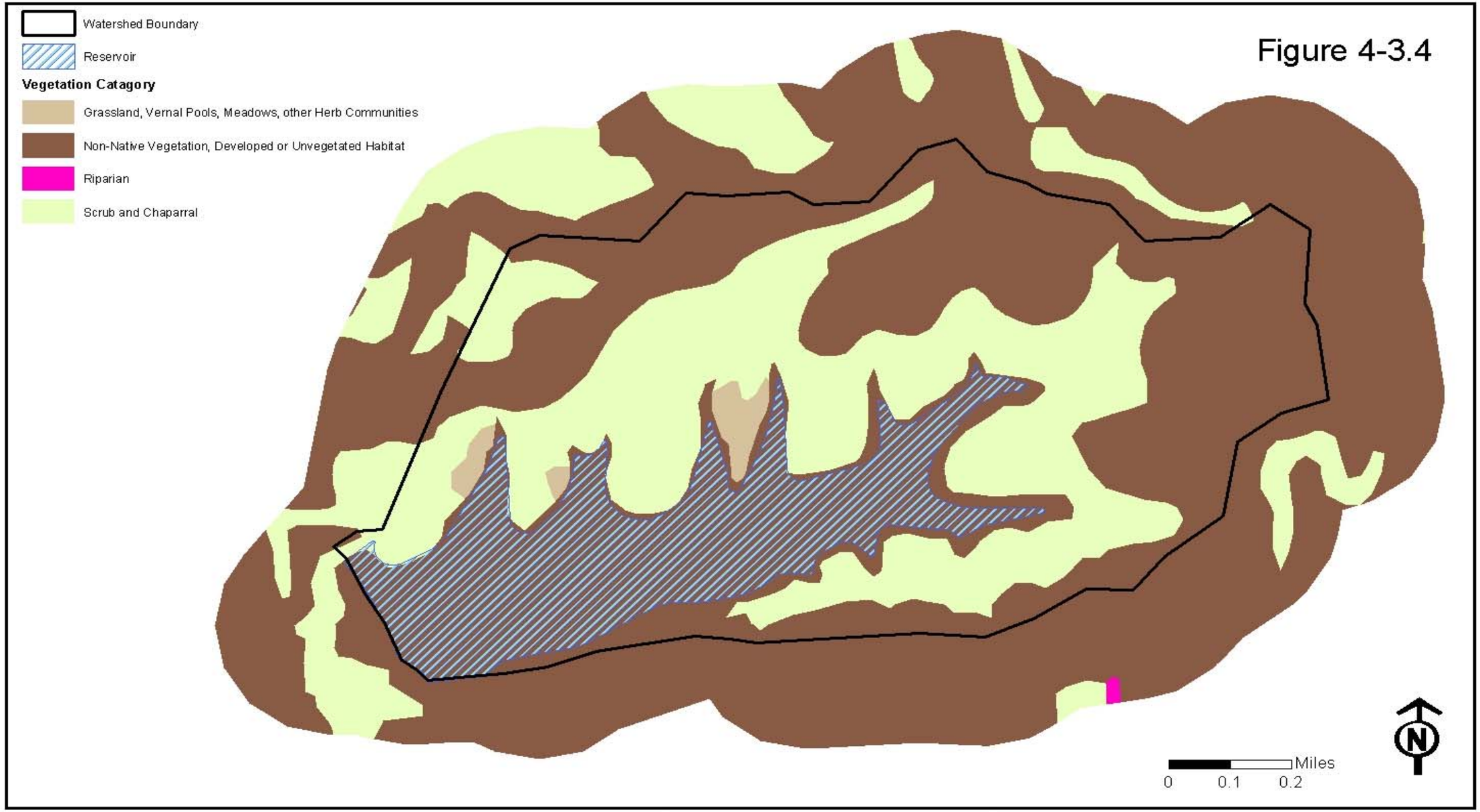
Created By: Dennis Brown
Date: 6 September 2005

SanGIS

Miramar Watershed VEGETATION

Figure 4-3.4



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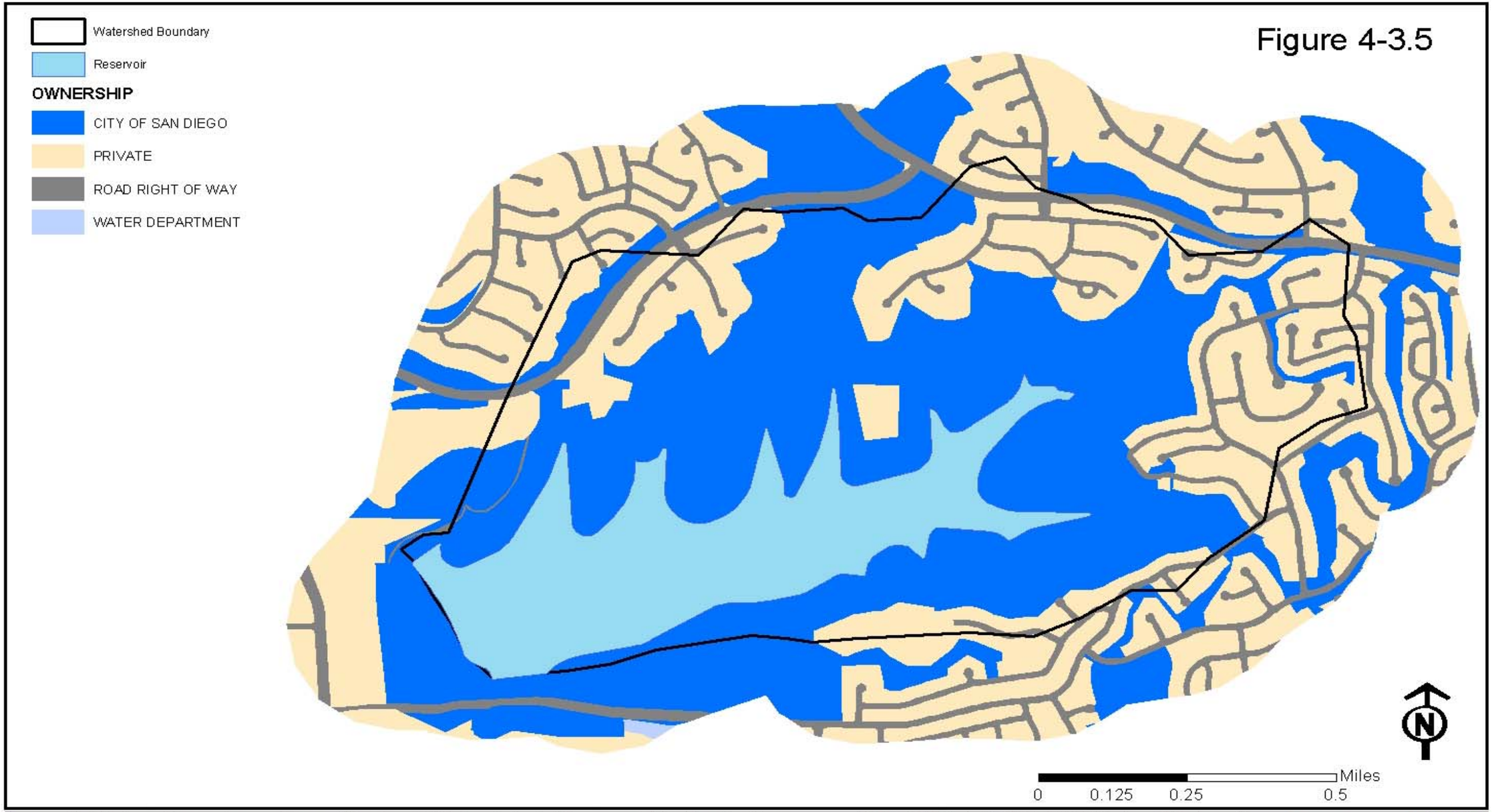
Date:08/15/05

Miramar Watershed LAND OWNERSHIP

Figure 4-3.5



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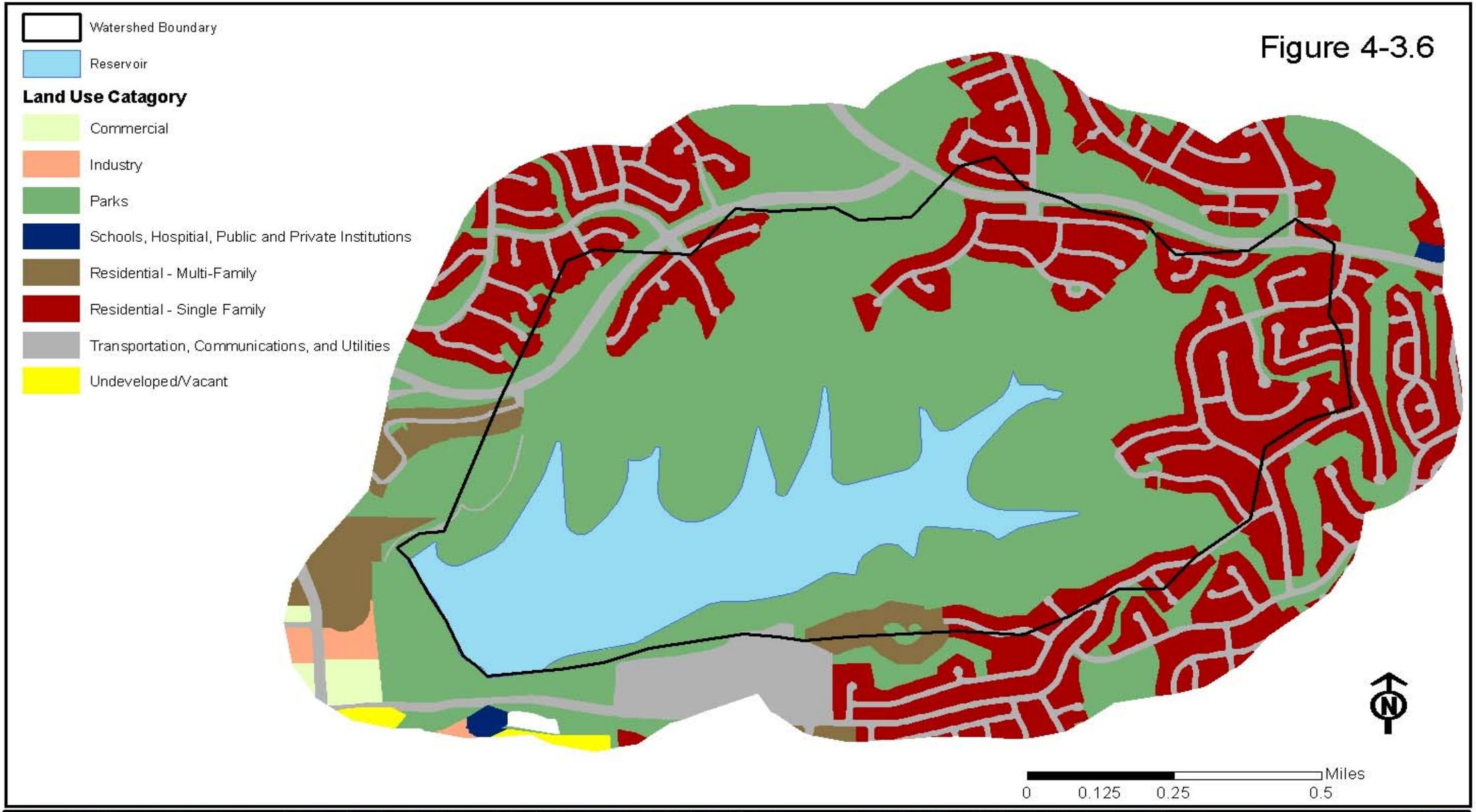
Date: 4 January 06

SanGIS

Miramar Watershed LANDUSE

Figure 4-3.6



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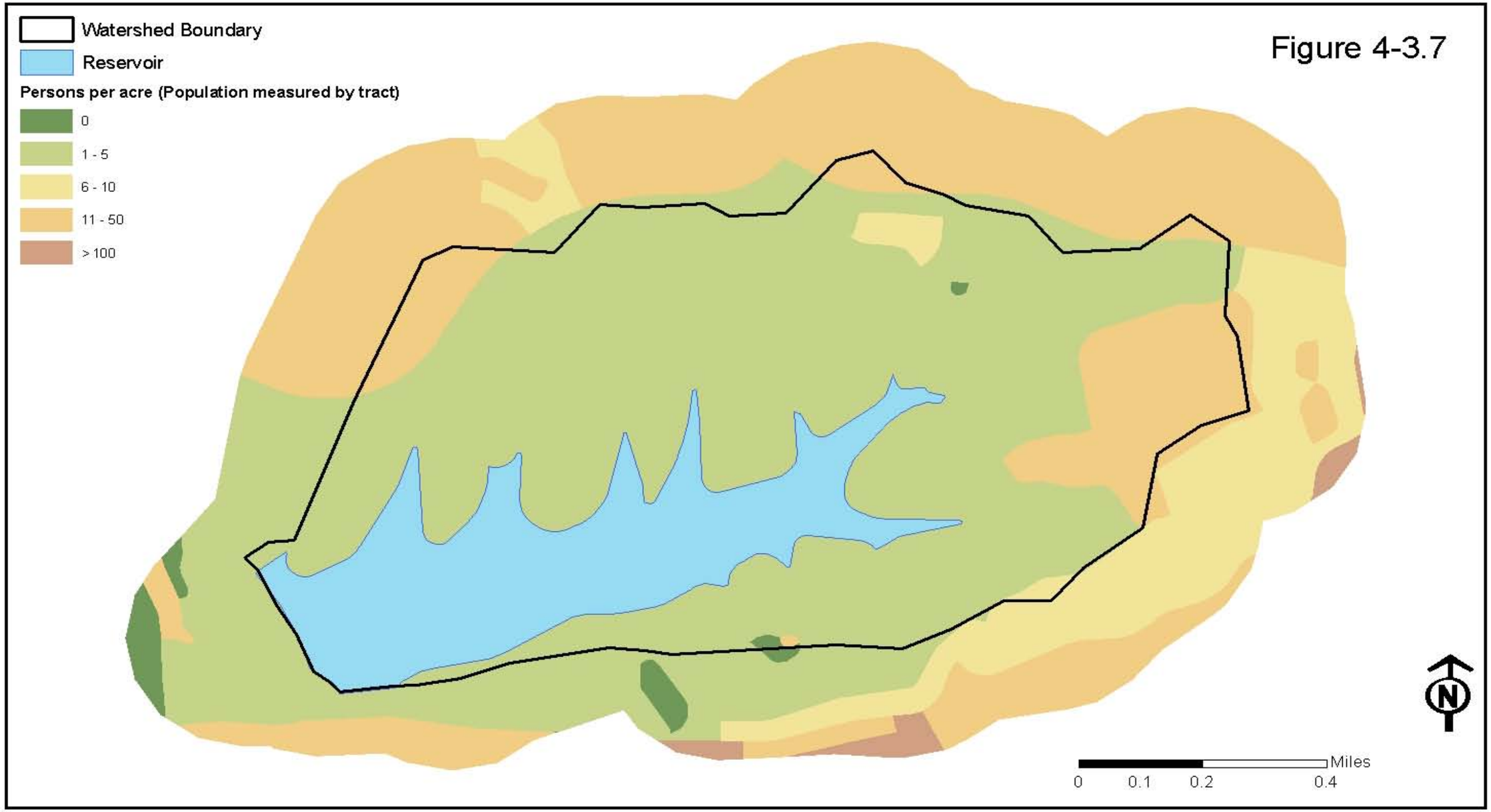
SanGIS

Miramar Watershed POPULATION DENSITY

Figure 4-3.7



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